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CATTLE RANCHING IN THE INTERIOR OF BRITISH COLUMBIA

1958-59

by

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ECONOMICS DIVISION

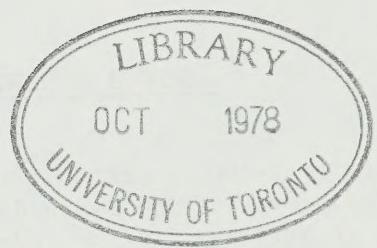
CANADA DEPARTMENT OF AGRICULTURE

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CATTLE RANCHING IN THE INTERIOR OF BRITISH COLUMBIA

INTRODUCTION

During the summer of 1959, a field party studied ranching in the ranch area of Interior British Columbia (see map). They interviewed 114 ranchers, and from each secured a record of the ranch business for the period April 1, 1958 to March 31, 1959. Information contained in the record included utilization of the land resources, methods of cattle operations, receipts, expenses, inventories, capital expansion and indebtedness. These ranchers gave information on grazing, wintering, irrigation and marketing problems. Data from these records were analyzed and studied with a view to determining expected earnings on ranches, factors contributing to profitable ranch operation and other pertinent facts. In the following pages of this report, the findings of this study are discussed and tabulated.

DESCRIPTION OF RANCHING AREA

The following outline of boundaries defines the area where most of the ranching is carried on and where the majority of cattle are produced under ranch conditions in British Columbia. It is bounded on the south by the International boundary, and extends from Grand Forks on the east to Princeton on the west, continuing in a relatively long arc to the northwest, with the following towns and settlements indicating roughly its outer perimeter. These points of reference are Lumby, Salmon Arm, Squilax, up the North Thompson Valley to Clearwater, and thence to the northern limit near Quesnel. From here it extends westward to Anahim Lake, and then southeastward through Tatla Lake, Lillooet, Lytton and Princeton. Generally, the cattle ranching areas are confined to the southern portions of the Interior Plateau.

Within this arc are such well known cattle ranching centers, as Merritt, Kamloops, Clinton and Williams Lake.

The watersheds.— In the main, the ranching area of British Columbia is drained to the west by the Fraser River system, which includes the Chilcotin, the Nicola and the North and South Thompson Rivers, and Bonaparte Creek. The southern section is contained in the Okanagan and Similkameen watershed area which drains south to the Columbia River in Washington via the Okanagan River. Through all this country there are many small creeks and lakes associated with the general topography.

Climate.— In this region the major air masses move, in the main, from west to east. Consequently the coastal range of mountains which run north and south have an important influence on the climate. The rainfall on the western slopes of the mountains is heavy and the vegetation dense, whereas the area east of the mountains is relatively dry. However, throughout interior British Columbia there are local differences in rainfall caused by differences in elevation.

Typically the valleys are dry and warm while the higher levels have more precipitation and lower average temperatures. As might be expected climatic changes also occur with changes in latitude.

Table 1 shows the altitude above mean sea level, and the long-time annual mean temperatures and precipitation for selected points in the ranching area of interior British Columbia. A study of the altitudes of the meteorological stations listed will show that these data are probably not representative of the area in general, particularly not of the higher elevation ranges. However, these figures indicate that generally north of the Thompson River the average mean temperature is about 5° to 10° colder and the winter snowfall is much heavier than to the south.

Table 1.- Meteorological data for selected points in the ranch areas of British Columbia a/

Temp- erature °F	Annual mean Number of Years	Mean annual		Winter snow b/ fall	Number of years	Altitude above mean sea level - feet -
		total precipi- tation	- inches -			
Grand Forks	45	44	16.33	45.9	45	1,746
Penticton	48	48	11.36	21.7	48	1,121
Princeton	42	17	14.55	6.1	17	2,283
Nickel Plate	35	29	23.58	145.5	29	5,800
Kamloops	47	63	10.16	29.2	65	1,133
Heffley Creek	41	6	13.25	48.8	6	2,240
Ashcroft	44	11	9.75	32.2	11	1,600
150-Mile House	38	10	16.01	60.8	10	2,200
Big Creek	37	55	12.44	44.9	55	3,100
Kleena Kleene	35	13	12.73	57.9	19	2,950

a/ Climate of British Columbia - Report for 1958, Department of Agriculture, Province of British Columbia.

b/ One inch of snowfall equivalent to 1/10" of precipitation.

Over most of the area about one half of the precipitation occurs in the late fall and winter and most of the remainder falls during May and June.

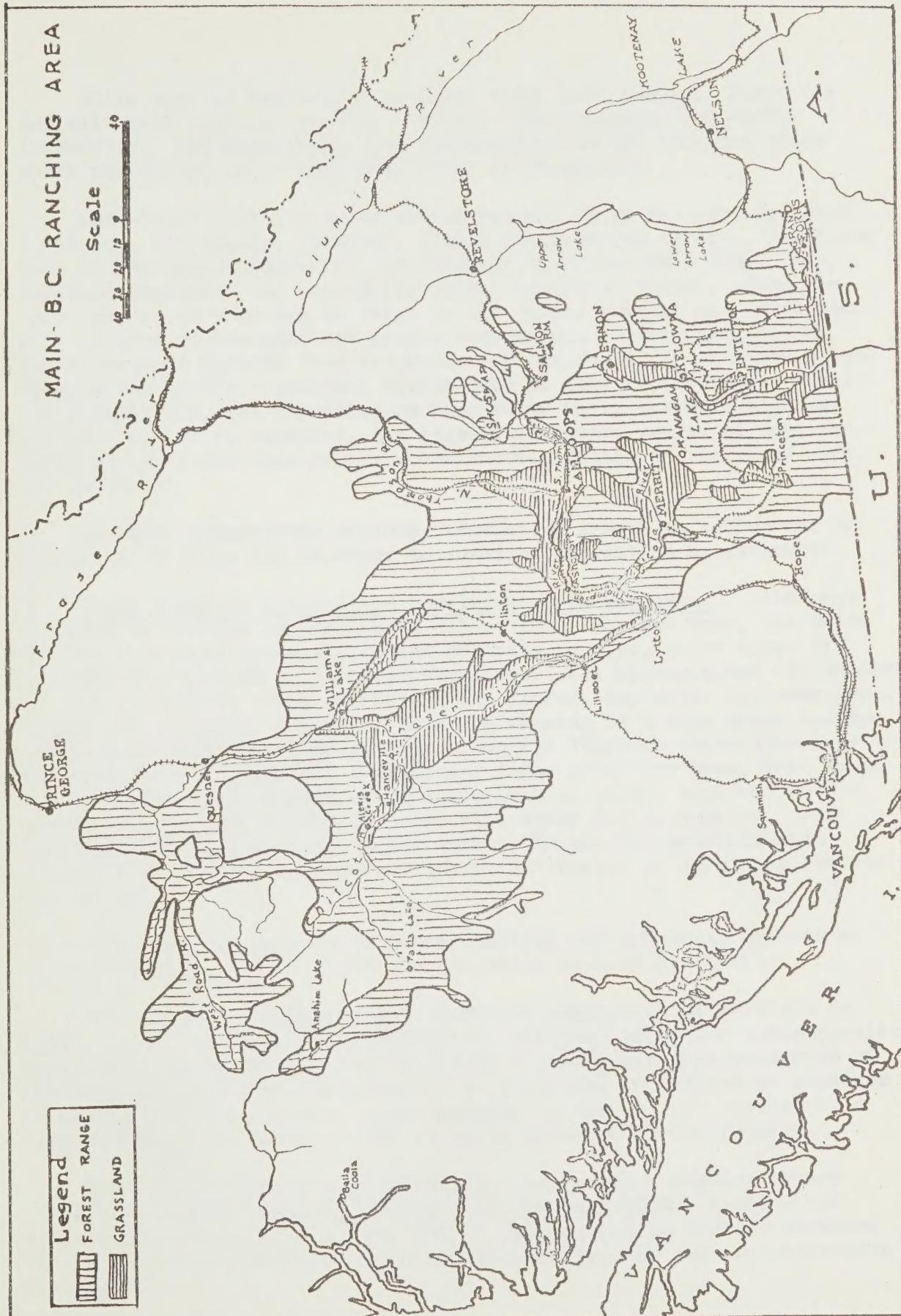
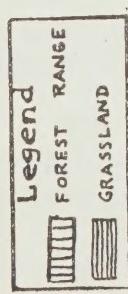
Soil, topography and vegetation.- The ranching area of British Columbia is contained in what may be termed the "Southern Plateau". It is an irregular plateau, broken by broad and narrow valleys, the former being usually associated with the main drainage channels. The plateau is further broken by frequent mountains and mountain ranges. To the south occur the highest elevation of 6,000 to 8,000 feet. The average altitude declines gradually northward.

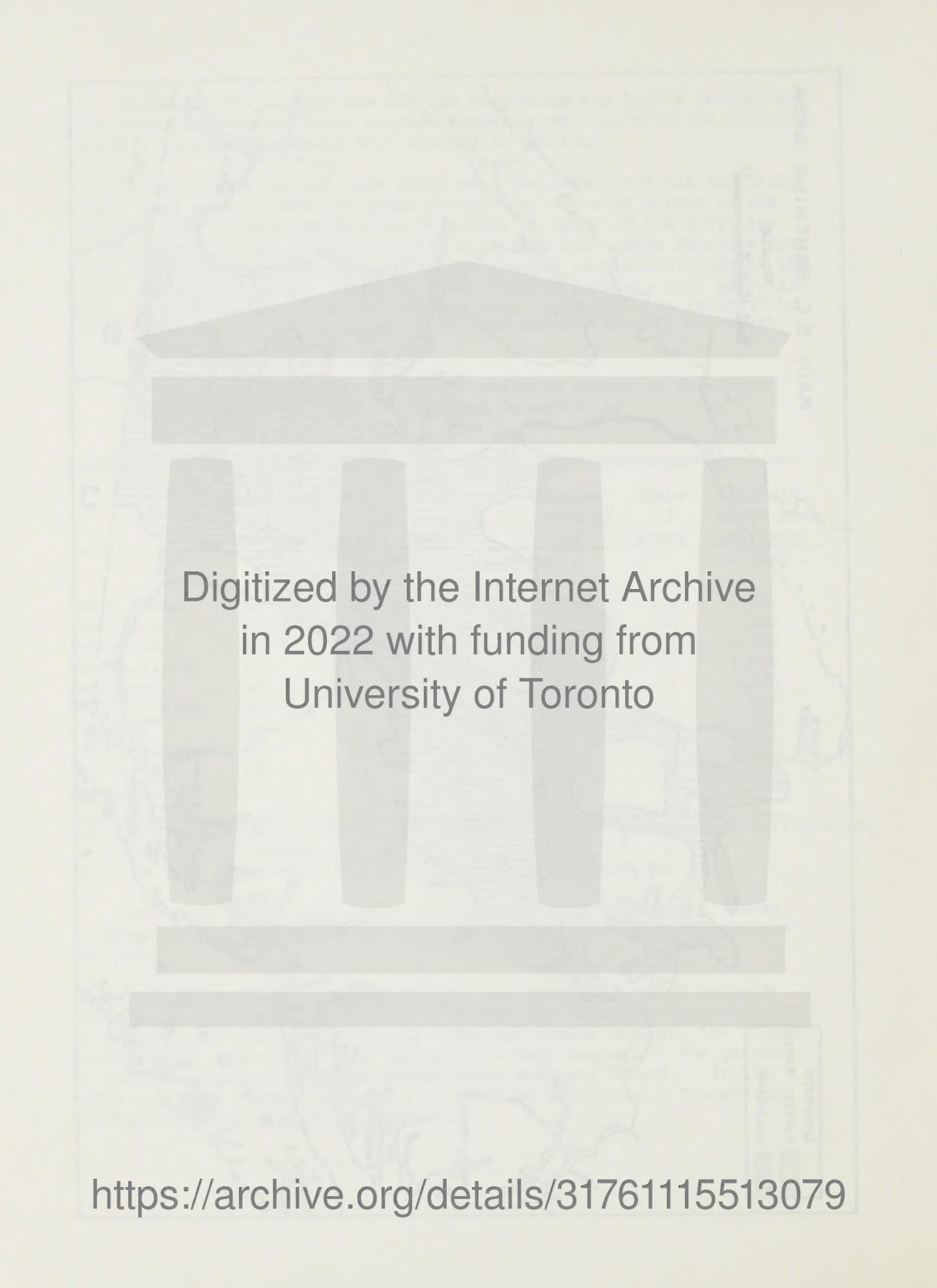
MAIN - B.C. RANCHING AREA

Scale

40
30
20
10

PRINCE GEORGE





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Soils vary in texture, with sandy loams most common. There are two main soil regions, namely, Grassland (Chernozemic) and Forest (Podzolic). The majority of the grassland soils are brown in color while the forest soils vary from brown to graywooded.

Associated with the lower elevations and along the main drainage channels - the Fraser, Thompson, Nicola and Okanagan Rivers - are found most of the open grasslands. As altitude increases away from these drainage channels, the vegetative cover changes to forest. Thus the upper grassland zone may be found in the valley bottoms and lower slopes. Higher on the mountain slopes the various forest zones occur. These progress upwards from the open pine and aspen areas, through the Douglas fir to the occasional Alpine zone at about 6,500 feet. Within the forest zone, and depending on topography there are open meadows. In Table 2, (as an example), the vegetative cover, period of use, carrying capacity and type of livestock characteristic of one range area, are indicated.

In these mountainous regions, vegetative growth is influenced by direction of slope and exposure to sunlight as well as by altitude.

Other types of agriculture and industry in the area. - Although ranching is carried on throughout all of the described area, including the dry grassland zones and wooded mountain regions, other types of agriculture flourish in isolated districts. The Okanagan and Similkameen valleys are widely noted for tree fruit production, while the Armstrong-Salmon Arm vicinity is adapted to mixed farming of a type which incorporates grain growing and dairying. Along the Thompson River from Kamloops to Ashcroft are occasional specialized farms producing hops, tree fruit and truck crops. Specialized products such as fruit, hops and market garden produce are limited to areas with water for irrigation. Near Ashcroft are several large turkey farms. In the Cariboo-Chilcotin country, agriculture is confined to the production of livestock (cattle and sheep).

The Okanagan has well developed packing and processing plants at convenient locations to serve its important orchard industry.

This area has several other important industries in addition to agriculture. Logging and lumber mills, the most important non-agricultural industries, are common to the region as a whole, with the exception of far western Chilcotin. Logging and ranching may be carried on together on the same forested land. Some trapping is done in the region and a limited amount of mining. Gold is still produced in the Cariboo.

The tourist industry is of growing importance. Popular summer resorts are established on Okanagan and Shuswap Lakes. Hunting and fishing attract many, thus providing a growing demand for the services of guides and outfitters. Guest ranches are popular and are increasing in numbers.

Table 2.- Some physical and biological characteristics of a range area near Tranquille, British Columbia.

Ranges	Zones	Elevation	Vegetation	Soil	Period of use	Estimated grazing capacity/ acre equivalent	Use
Grassland	Lower grassland	Up to 2000'	Bluebunch wheatgrass, sagebrush, cheat grass when overgrazed	Includes black, sandy soil	Early spring and late fall	3.0	Cattle & sheep
	Mid-grassland	2000'-2700'	Bluebunch wheatgrass, andberg bluegrass, forbs, rabbit brush; needle grass when overgrazed	Dark brown, brown and brown	Spring and fall	2.3	Cattle & sheep
	Upper grassland	2700'-3000'	Bluebunch wheatgrass, rough fescue, forbs, yarrow, fleioane, lupines, balsam-root; Columbia needlegrass and kentucky bluegrass when overgrazed.	Desertic soils of the grassland regions	Late spring and early fall	1.1	Cattle & sheep
Forest	Ponderosa pine type	1200'-14500'	Undercover of bluebunch wheat grass, June grass, rough fescue, rabbitbrush, perennial forbs	Brown wooded	Late spring and early fall	2.5	Cattle
	Douglas fir type	4500'-5000'	Undercover of brorse-herbs and shrubs; pinegrass, forbs, vetch, peavine, aster, wild rose, willow	Wooded soils		4.0	Cattle
	Spruce fir type	5000'-6500'	Undercover of blueberry-mosses, lichens, sedges, intermediate cat grass	Middle summer		1.0	Cattle limited
Alpine and sub-alpine meadow	6500' and over	Alpine grasses, sedges and forbs	Alpine brown on meadows; lithosolic soils				Sheep cattle

a/ Animal Units per M.P.E. Equivalent.

Sources: 1) E.H. Tisdale, A. McLean and S.Z. Clarke, Range Resources and their management in British Columbia, Journal of Range Management, Vol. 7, no. 1, January 1954.

2) V.C. Brink, Chairman, Division of Plant Science, University of British Columbia, Vancouver, B.C.
3) L. Farstad, Senior Pedologist, Soil Survey of Canada, Department of Agriculture, Research Station, Vancouver, B.C.

Population centers, services and transportation. - With the exception of the Chilcotin district, few ranchers are more than 35 miles from a main shipping and trading point. Williams Lake is the main town servicing the northern area. Scattered small settlements extend from Williams Lake over 200 miles westward. There is a greater number of cities and towns in the southern part of the region, this probably being associated with greater diversification of agriculture.

Table 3.- Main centers of population in the ranching areas of British Columbia

City or town	:	Population - 1956
Grand Forks		1,995
Penticton		11,894
Kelowna		9,181
Vernon		8,998
Armstrong		1,197
Princeton		2,245
Merritt		1,790
Kamloops		9,096
Williams Lake	..	1,790

Source: Census of Canada, 1956.

These cities and towns provide services such as secondary schools, doctors and hospitals as well as purchasing and selling facilities.

The region is very well serviced by railroads, roads and airlines. Two main transcontinental railways (C.N.R. and C.P.R.) enter Kamloops from the east and northeast, and follow the same route via the Fraser River to seabord at Vancouver. In addition, a third transmountain line known as the Kettle Valley line (C.P.R.) serves Grand Forks and Princeton. Connecting north and south rail lines pass through all important points in the southern area.

The B.C. Government Railway (P.G.E.) travels northeast from Vancouver, crossing the C.N.R. at Prince George and continuing on into the Peace River area at Dawson Creek. This line provides service for the Cariboo and Chilcotin at such points as Clinton, 100-Mile House and Williams Lake.

Hard surfaced highways serve all towns and cities in the interior. The Chilcotin area is the exception, having a gravel road which deteriorates as distance increases from Williams Lake. There are all-weather gravel roads leading to many ranches. The logging companies have done much by building and improving logging roads to aid the rancher with better travel conditions.

Air fields having daily plane services are at Penticton, Kamloops and Williams Lake.

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TRENDS IN POPULATION AND LIVESTOCK NUMBERS

The population of British Columbia doubled between 1931 and 1956. In the same period, the numbers of people living on farms remained relatively constant, but in proportion to the whole population declined from 15 per cent to eight per cent (Table 4).

Table 4-- Trends in population in British Columbia and numbers of cattle and sheep on farms and ranches, 1931 and 1956 a/

Year	Population on farms	Cattle (exc. milk cows)	Cattle in b/ ranch area (exc. milk cows)		Sheep in ranch b/ area
			Sheep	- number -	
1931	694,263	102,367	131,387	n.a.	146,577
1941	817,361	102,446	203,104	131,378	125,931
1951	1,165,210	120,292	212,493	130,070	67,474
1956	1,398,464	112,668	332,702	179,842	86,053

a/ Census of Canada, 1931, 1941, 1951 and 1956.

b/ Ranch Area Studied - Census Divisions and Sub-divisions, No. 3, 6c, 6d, 6e, 6f, 8c and 8d.

During this span of 25 years, the cattle numbers on British Columbia farms (exclusive of milk cows) increased by more than two and one-half times to a total of 332,702 head in 1956.

Over 50 per cent of the beef cattle in British Columbia were raised under ranch conditions and in the ranching areas described in the report.

Cattle Marketings

1. About 30 per cent of the cattle population of the province is marketed annually.

2. Although the annual marketings of British Columbia produced cattle are not sufficient to satisfy the requirements of the province's population, a part of the total annual production is shipped to other provinces, mainly Alberta, or to the United States for feed lot finishing.

3. There has developed a demand for uniform supplies of finished cattle. There are not sufficient quantities of feed produced in the cattle producing areas of British Columbia to finish the cattle produced there and they are therefore shipped to areas of more plentiful feed supplies to be fed. Thus, in-shipments of finished live cattle, mostly from Alberta for slaughter in British Columbia packing plants, greatly exceeds the slaughter of cattle from British Columbia. (See Figure 2).

4. In addition to live cattle, large quantities of chilled carcasses are brought in by rail and refrigerator truck to satisfy the increasing demands of a growing population.

5. Expansion of the feeder finishing business in British Columbia is dependent in a large part on the availability of feed at a price which would make the feeding operation competitive with other areas. Apparently, it has been considered by cattlemen that it is more economical to ship grass fed cattle to feed producing areas and finished cattle back to British Columbia than to ship feed into British Columbia for feeding.

LAND OWNERSHIP AND TENURE

The general pattern of land ownership and tenure was relatively the same for all ranches. It included some owned and some leased acreage, through a grazing permit authorizing the use of Crown land for range for a specified number of stock.

As a rule the land owned by the rancher was located in a valley bottom, having arable acreage suitable for cultivation and in many instances access to water for irrigation. On the owned area was situated the headquarters, (homesite), cultivated fields for winter feed production and wintering grounds for the livestock.

Adjacent to or reasonably close to the headquarters land was the operator's leased acreage. On the average, ranchers had one acre of lease for every two acres of land owned. The leased area in the majority of cases was not as desirable range land as the owned acreage, but it provided a great part of the spring and fall grazing, and where open meadows existed, hay was cut and stacked. Lands were leased from the Provincial Government for periods varying from one to 21 years, but most leases had formed part of the total ranch area for a long period of years. The various parcels of lease land have been rated as first, second and third class lands, and according to classification, the rancher paid a rent of 25 cents, 15 cents, and four cents per acre respectively, plus local taxes. Most land leased for grazing fell into the third classification.

In British Columbia the province controls a vast area of land termed "Crown range". It includes approximately ten million acres of forested mountain terrain together with associated grassland in the ranching regions. The forest ranges not only provide summer grazing for stock, but also furnish timber for the lumbering industry of the interior.

Each rancher applies annually to the B.C. Forest Service for permission to graze stock on a particular Crown range. He is issued with a "grazing permit" allowing him to pasture a specified number of animals which is related to the size of his ranching operation and the range available for a stated period of time, (normally June 1 or 15 to October 1 or 15 for forest range, but for a longer period if grassland Crown range is available). A fee for use of the Crown range is charged on a "per animal per month" basis. The annual fee varies, as it is related to livestock price movements of the

preceding year. In 1959, the rate was 15 cents per head per month for cattle.

The Forest Service of the Department of Lands and Forests administered the utilization of the Crown range, determining the livestock carrying capacities, grazing period, improvements and other related policies. One half of the annual grazing fees is set aside for improvements to the range to aid in fuller use of these areas and in increasing carrying capacities. Capital costs of improvements such as drift fences, water holes and regrassing, particularly along trails opened by logging companies are paid from this fund to the extent that money is available. In some instances ranchers shared in the costs of range improvements with the Forest Service. In other cases, operators have borne the full cost if money was not available in the fund, and if immediate grazing benefits resulted from the improvement.

TERMINOLOGY

The following terms are defined in order to help the reader in his interpretation of the study.

Animal unit.— Is one mature cow or the equivalent in other livestock, based upon the amount of feed consumed and manure produced during a year. 1/

Productive man work unit.— is equal to one ten-hour day of labor.

Man-equivalent.— is equal to the labor of one man for a year, (26 ten-hour days per month x 12 months = 312 days per year).

Animal units per man-equivalent.— is the number of animal units one man cares for during a year. A herd of 100 animal units per man-equivalent was determined to provide full-time employment for one man on ranches with the highest labor income per animal unit.

Perquisites.— are those non-cash items that the ranch contributes to the family living, such as food and fuel, as well as an allowance for the use of the house.

Family farm income.— is the difference between the year's cash receipts and cash expenses with allowance being made for changes in value of inventory and for depreciation on farm capital assets. It might also be defined as the return to the capital labor and management supplied by the ranch owner-operator and his family.

Operator's labor income.— is the family farm income less a wage for unpaid family labor, and less a deduction for the use of capital, (five per cent was charged for the use of capital).

Operator's labor earnings.— is the operator's labor income as above defined, plus the value of the ranch perquisites used by the family.

1/ See Appendix 8 for conversion factors used.

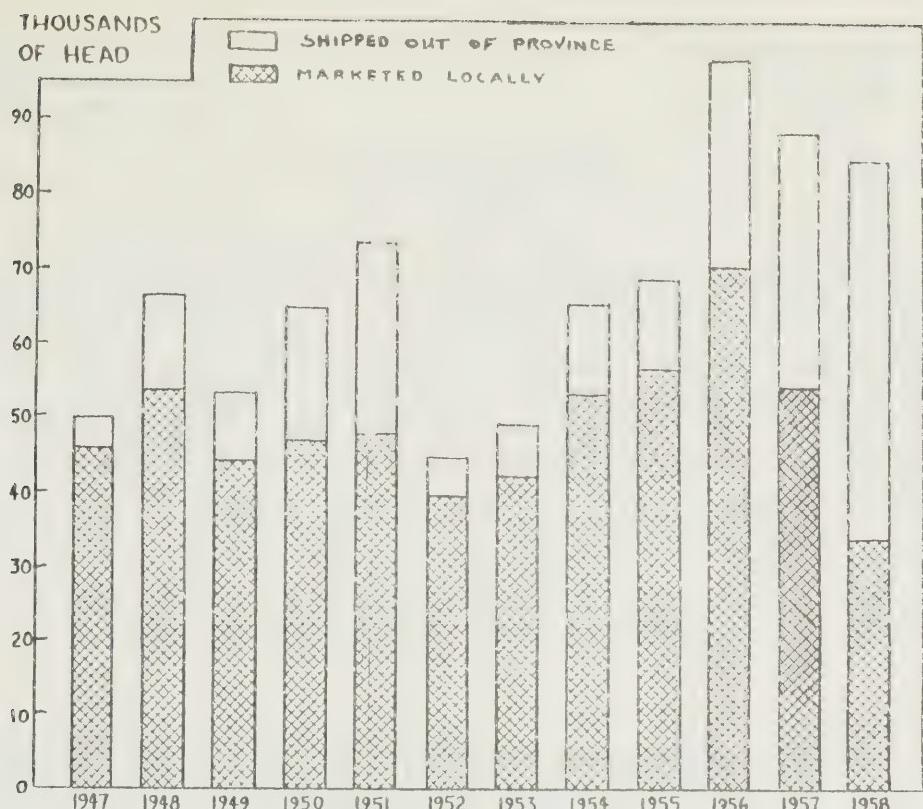


FIGURE 1. - TOTAL NUMBERS OF B.C. PRODUCED CATTLE AND CALVES MARKETED, 1947-58

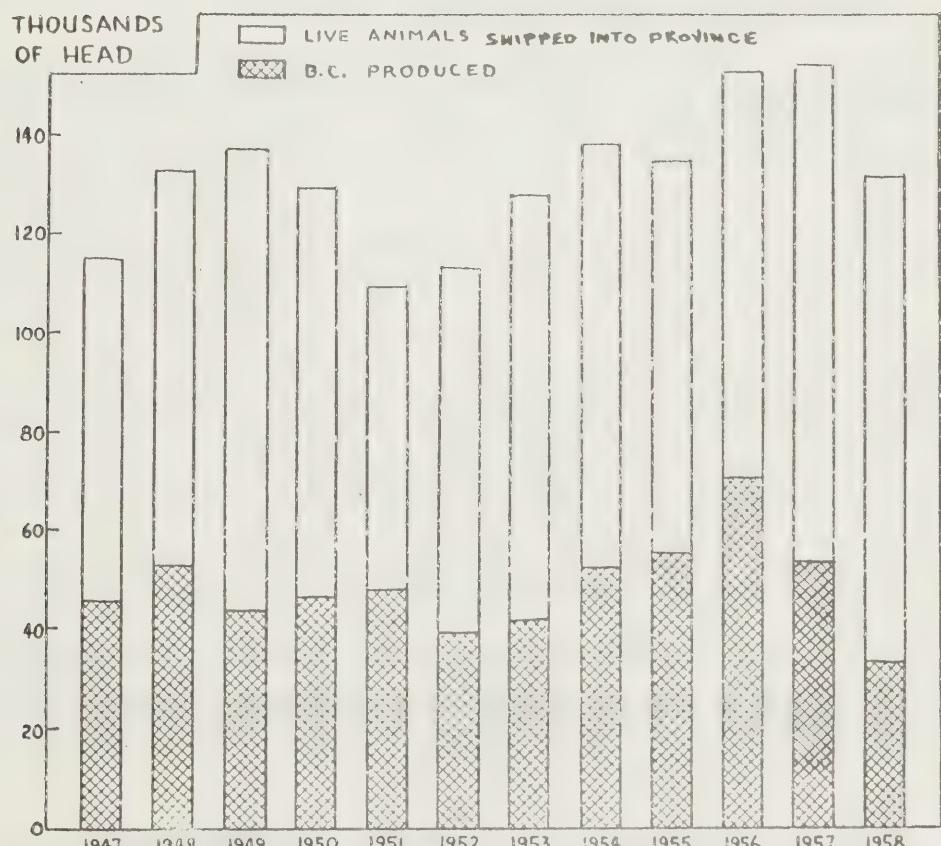


FIGURE 2. - TOTAL NUMBERS OF CATTLE AND CALVES SLAUGHTERED IN INSPECTED B.C. PLANTS, 1947-58

Source: Livestock Market Review, Markets Information Section, Marketing Service, Department of Agriculture, Ottawa, Canada.

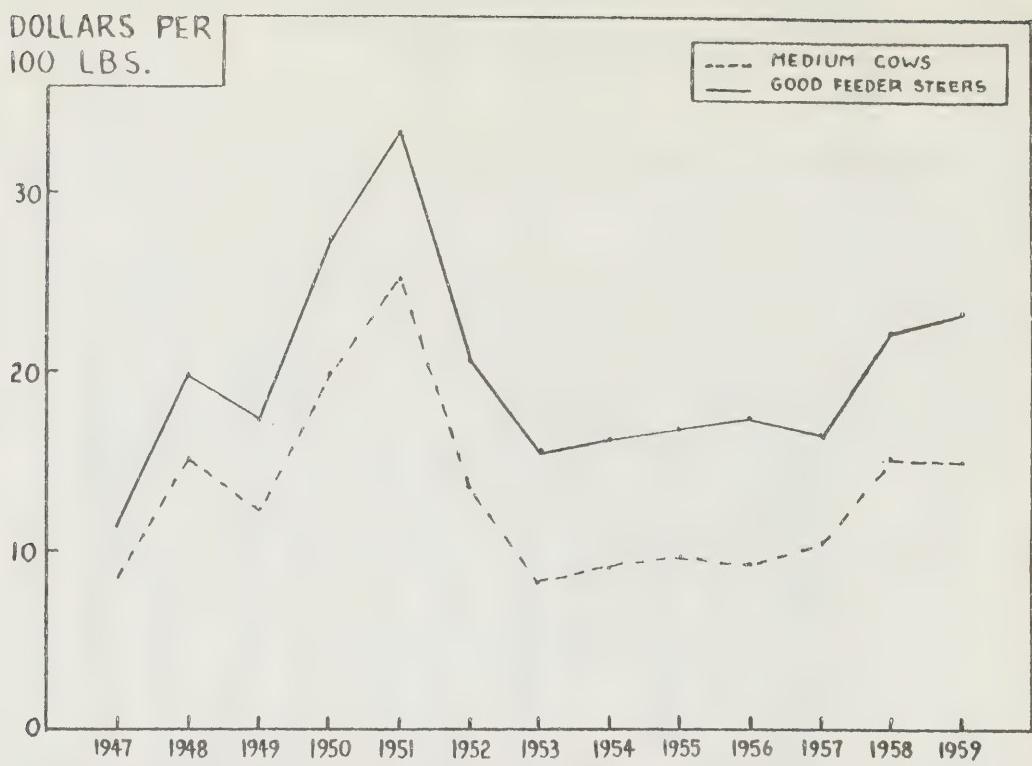


FIGURE 3.- AVERAGE PRICE OF MEDIUM COWS AND GOOD FEEDER STEERS AT CALGARY,
MONTH OF SEPTEMBER, 1947 - 59.

Source: *Livestock and Animal Products Statistics*,
Dominion Bureau of Statistics.

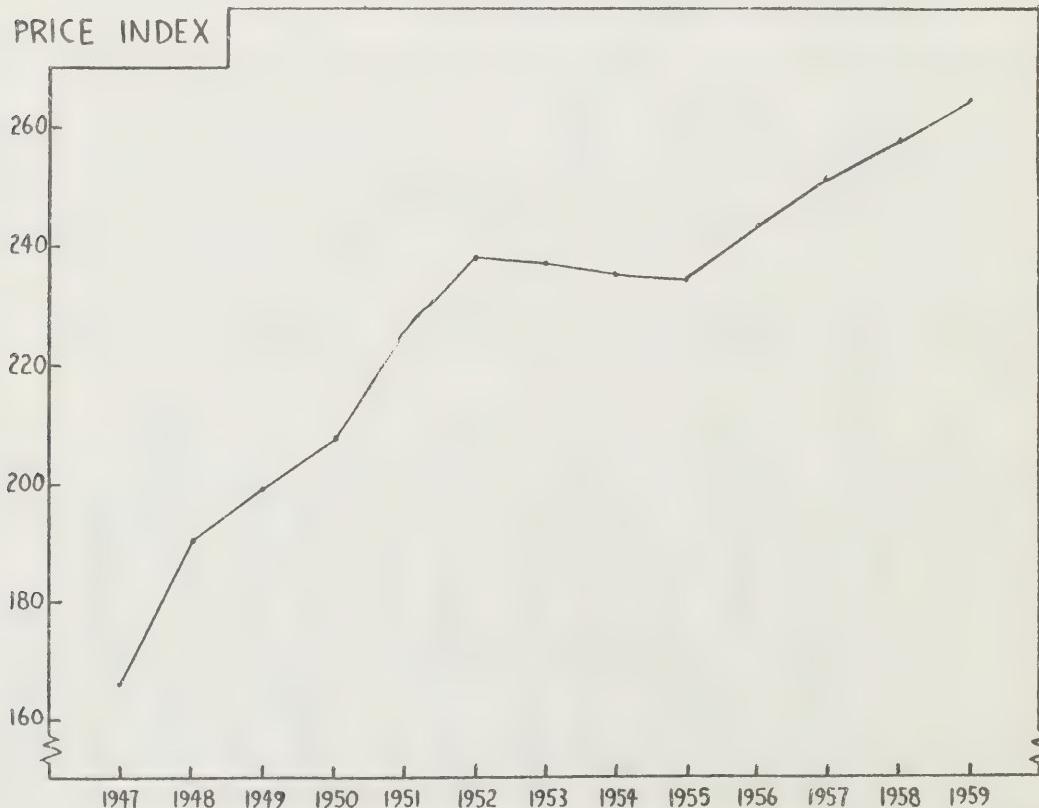


FIGURE 4.- PRICE INDEX NUMBERS OF COMMODITIES AND SERVICES USED BY FARMERS IN
WESTERN CANADA, 1947 - 59 (EXCLUDING FAMILY LIVING COSTS)
(1935 - 1939 = 100)

Source: *Dominion Bureau of Statistics, Prices and Price Indexes*.

RANCHING PRACTICES

Use of grazing.— A rotational grazing pattern was followed by most ranches. Cattle were wintered on the valley floors close to headquarters or on meadows where reserves of feed were available. In the spring the stock were moved onto grass at the lower levels of between 1,000 feet and 2,500 feet. This meant the early season grazing was on owned or leased land. Commencing approximately June 1, as designated by the Forest Service in each individual's grazing permit, the animals were moved on Crown range, and as the season progressed and the vegetation developed at higher altitudes, moved upward for grazing to about the 5,000 foot level. With the approach of fall and cooler weather the process was reversed with cattle gradually descending until by October most animals were again pasturing on owned and leased land, including hay aftermath fields. With the advent of snow, feeding became general in the feed yards in the month of December or even earlier depending on location.

It was impossible to secure conclusive data from ranchers regarding carrying capacities of the ranges or pasture lands. However, from a study of their various records it appeared that on the average ranchers felt that about 3.5 acres of both owned and leased ranges were capable of carrying one animal unit for one month. The carrying capacities of both cultivated pastures and hay aftermath fields, some of which were irrigated, were each equivalent to nearly one acre per animal unit month.

Seventy-five per cent of ranchers interviewed were of the opinion that the hay land for the production of winter feed and the grazing acreages available to them were in balance. A small number, namely eight per cent had ranches where the ability to produce winter feed was greater than the carrying capacity of the grazing land.

Seventeen per cent of the ranchers had a scarcity of acreage suitable for producing winter feed for the amount of stock they could maintain on grass during the pasture period.

About 42 per cent of 71 ranchers reporting expressed the opinion that they could carry more stock if the carrying capacities of the ranges were increased by regrassing programs, clearing out of timber slash, and construction of more logging roads to higher elevations. They were also of the opinion that their headquarters areas could be made more productive by the development of irrigated pastures.

Breeding practices.— Very few ranchers kept the female stock in a breeding pasture until they were certain all cows were bred. Over 50 per cent of the operators questioned indicated that the procedure was to place all animals on Crown range as soon as spring grazing opened. Another group of 36 per cent started the breeding season while the cows were confined to home pastures or leases but completed servicing of the females on the summer grazing permit lands.

The practice of using Crown range as a breeding pasture resulted in loss of control by the rancher if a breeding program were being followed. As several cattlemen used the same range, to some extent, the quality and size of the calf crop depended upon the standard and number of bulls each operator maintained in the open grazing areas. Another important feature of this type of ranch operation was that it was essential that only one breed of cattle be placed on each range. Generally the Hereford breed predominated in the Interior ranching regions.

Use of the public domain for the production of livestock presented problems in the operation of a ranch. The lack of perimeter and cross fences creating pasture fields, made it practically impossible to segregate cattle by groups of age and sex during the grazing season. Nevertheless nearly 50 per cent of the ranchers indicated that they made provision to pasture the marketable stock (mainly steers) away from the breeding herd.

The ratio of cows per bull varied from 15 to 50 at the extremes. Including yearling heifers assumed bred, the average was 30 cows per bull.

On seventy per cent of the ranches some yearling heifers were included in the cow herd and bred. Operators did not necessarily believe this always to be the best practice but it was adopted to avoid operational difficulties. Seventy-nine ranchers recorded their views on breeding of yearling heifers as follows:

Distribution of replies

	<u>For</u>
1. Heifers grow into better cows	4
2. Unproductive period is shortened and productive period is lengthened	18
3. Impossible to keep heifers separate from breeding herd	34

Against

1. It stunts growth of heifers	9
2. Heifers produce poor calves	1
3. Heifers calving; as 2-yr. olds suffer a heavy mortality	13

The reproductive life of a cow on the range was considered to be from seven to 10 calves. In order to maintain a herd of relatively young and productive females, a replacement rate of 13 per cent was the general practice.

Calving and calfhood operations.— For the particular year of the study the calf crop averaged 70 per cent. Two-year-old heifers on hand in the spring (April 1, 1958) were assumed to have been in the breeding herd as yearlings. Calf crop was defined as the number of calves born and tallied into the stock count at branding time.

On a few ranches, cows commenced calving in February, and all operators reported the birth of calves as general in March and April. Calving was usually completed by the end of July.

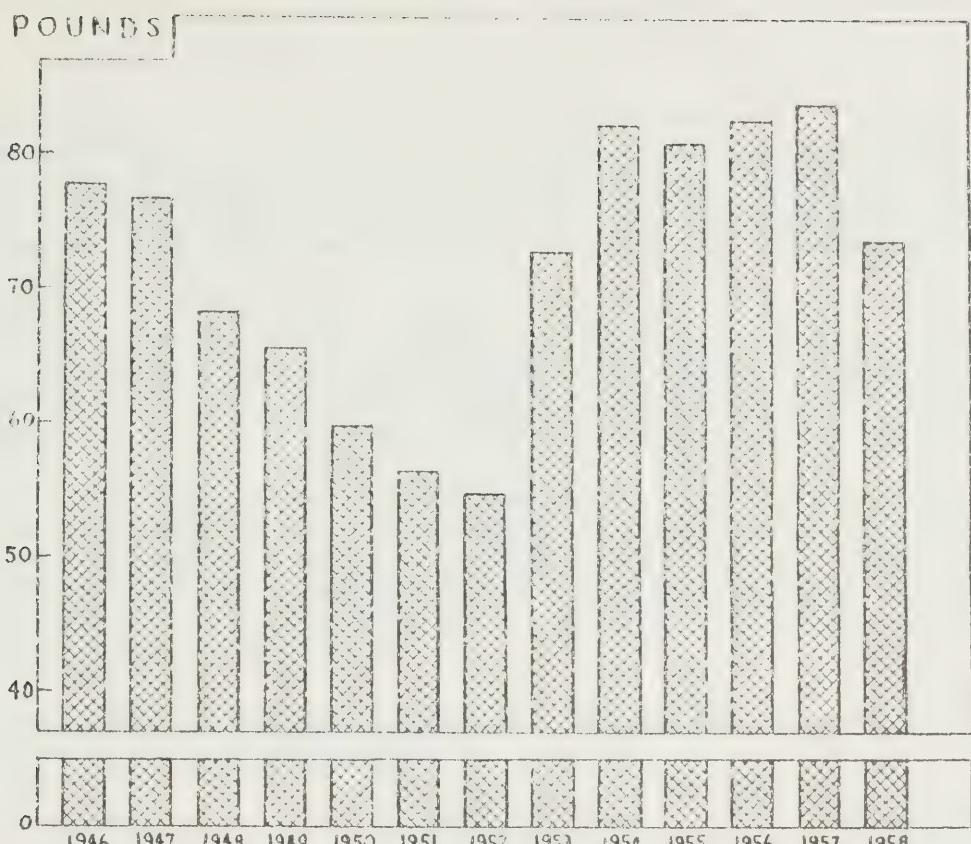


FIGURE 5. - PER CAPITA CONSUMPTION OF BEEF AND VEAL IN CANADA, 1946-58
*(BASIS - COLD DRESSED CARCASS WEIGHTS)

Source: Dominion Bureau of Statistics, Quarterly Bulletin Agricultural Statistics

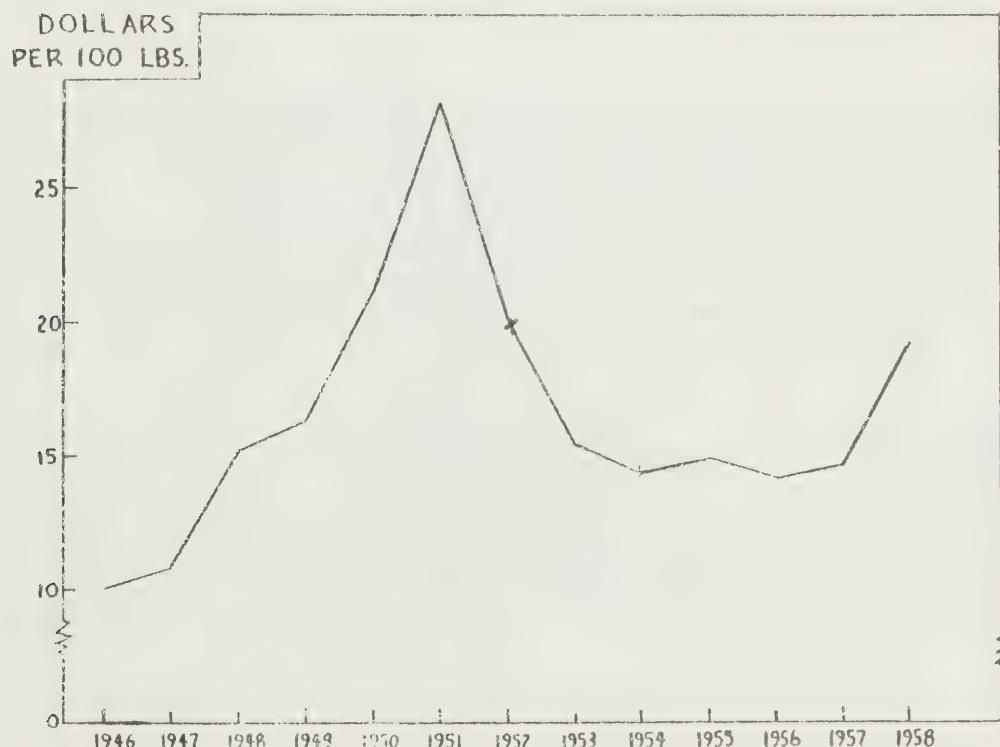


FIGURE 6. - WEIGHTED AVERAGE PRICES OF CATTLE AT PUBLIC STOCKYARDS IN CANADA, 1946-58

Source: Livestock and Animal Products Statistics,
Dominion Bureau of Statistics

Most ranchers arrange to gather all calves born by mid-June, for branding, castrating and vaccinating in the first part of July. Late calves were done at a fall round-up. Nearly 70 per cent of the ranchers delayed dehorning until the following spring when the animals were rising yearlings. Weaning of calves was done in the fall.

Winter feeding.— The winter feed requirements of cattle varied according to the location of the ranch, with elevation being as important a factor as latitude and direction of slope. Although a range of from 2.5 to six months was reported by operators as length of feeding period, the average was 4.3 months.

Ranchers estimated that the hay requirement for wintering was 1.4 tons per cow and one ton for a yearling. The per ranch average hay consumption amounted to 285 tons with a normal hay reserve of 76 tons being carried. Concentrates or supplements were fed by very few operators. Those ranchers feeding grain or pellets, mainly to calves and bulls, used an average of 20 tons, but 22 per cent of the operators fed only hay.

Ranchers reported a difference in the winter feeding period and hay intake of various classes of animals as follows:

	Feeding period (days)	Pounds of hay per day per head
Calves	141	11.7
Yearlings	129	17.4
Two and three-year olds	129	21.1
Cows	127	21.6
Bulls	139	25.8

Cropping practices and irrigation.— On the average ranch farming operations were, in the main, concerned with the growing of hay. In this dry ranching region irrigation in some form was an important factor in crop production. Although eight out of 80 operators reporting did not artificially flood the land, 54 per cent of the total improved acreage excluding meadow land, was irrigated by some method. Of the acreage classified as improved land, 47 per cent was mixed hay, 16 per cent in wild meadow hay and 13 per cent in alfalfa. Acreages in alfalfa may be below normal because of winter killing in the winter of 1957-58. The most important feed crops grown are shown in Table 5.

Although a few operators had acreages under ditches of operating irrigation projects, the majority secured water individually from rivers, streams, dams or lake either by gravity flow or by pumping. Probably because of the topography of the interior terrain, 50 of the ranchers were able to irrigate by gravity flow and in many instances the drop was sufficient to provide pressure for sprinkler operation. On 22 ranches it was necessary to pump for all or part of the irrigated acreage in order to elevate the water or to create pressure (Table 6).

Table 5.. Improved acreage and distribution of crops on 80 British Columbia ranches for the year 1958

	: Irrigated	: Non-irrigated	: Total
	- acres -		
Average acres improved per ranch including meadows	162	125	287
- per cent -			
Grain	2.5	3.2	3
Grain hay	3.7	2.4	3
Alfalfa hay	19.7	5.6	13
Mixed hay	66	21.6	47
Cleared for breaking a/	-	-	2
Farmstead, pasture and idle a/	-	-	16
Hay meadows	4.3	30.4	16
Total			100

a/ Breakdown not reported.

Flood irrigation as a rule made use of excess water at certain seasons of the year and was usually associated with the spring run-off. As a result, lands irrigated by this method could be irrigated for only a limited period and did not derive the benefits that accrue from having water available throughout the season. Thirty-three ranchers used flood irrigation exclusively while several others used this method in conjunction with sprinkler or furrow irrigation.

Table 6.. Irrigation, source of pressure and methods of water distribution on 80 British Columbia ranches for the year 1958

Source of pressure	: Distribution of replies	: Method of distribution	: Distribution of replies
No irrigation	8	No irrigation	8
Gravity only	50	Sprinklers or combined with furrow or flood	24
		Furrow or combined with flood	13
		Flood	33
		Method not reported	2
Total	80	Total	80

A group of ranchers (22) using sprinkler irrigation for hay lands reported their investment in pipe, sprinklers and pumps at \$73.00 per acre irrigated.

Very few operators purchased or used any commercial fertilizer. The production of barnyard manure on most ranches was limited because of winter feeding methods employed on ranches.

The average yields of all hay harvested was 1.5 tons per acre, with alfalfa grown under irrigation averaging 2.25 tons. On 41 ranches, operators reported at least part of their cultivated acreages as being irrigated by sprinkler, furrow or controlled flood methods, with several applications of water during the season. Hay yields from these particular acreages averaged two tons per acre. However, on seven ranches hay yields averaged more than three tons per acre. It appeared from a study of the yields data, that hay yields could be improved by most operators. In some cases expenditures would be necessary to improve present irrigation schemes and methods, but by so doing ranchers could be assured of a greater supply of feed annually. A more adequate irrigation program on ranches would result if particular attention were given to:

1. Source of water supply - if possible a reserve of water should be developed to provide for irrigation throughout the season.
2. Drainage - in some fields, yields would be improved if excess irrigation water were not allowed to lie on the land.
3. Distribution of water - sprinkler, furrow or controlled flood methods could be expanded or improved so that the irrigated acreages would be covered adequately and at the correct intervals.
4. Cultural practices - these could be adjusted to make the best use of the available water supply.

TYPES OF RANCHING

Most of those co-operating in the study could be classified as full-time ranchers. Thirty-four of the operators did not fall into this general classification, either because: (1) their livestock businesses were small and they secured additional income from outside employment; or, (2) they operated ranches as large as other full-time ranches but associated with other businesses; or, (3) they also produced appreciable amounts of other agricultural products. In order to study the differences in these ranch organizations the records were sorted into the following classes and sub-classes.

Full-time ranching (80) - Returns from cattle or sheep were equal to or exceeded 70 per cent of the total returns from all sources.

Ranching associated with other occupations or enterprises (34) - (a)
Part-time ranching (17) - Returns from cattle and sheep were less than 70 per cent of total returns and returns from non-agricultural sources formed a substantial part of the income. The size was smaller than 100 animal units.

(b) Two-enterprise ranching (5) - The same as part-time ranching, excepting that the size was more than 100 animal units.

(c) Off-type (12) - Returns from cattle and sheep were less than 70 per cent of total returns, and returns from crops and other livestock exceeded all other sources of income.

FULL-TIME RANCHING

As previously defined, this group of 80 ranches were those where returns from cattle or sheep were equal to or exceeded 70 per cent of the total returns from all sources. Income thus was predominantly from ranching as a full-time occupation.

The data on these full-time ranches were analyzed to ascertain why some ranches operated on a more profitable basis than others. The ranch records were divided into three groups, high (26), medium (28) and low (26), on the basis of operator's labor income per animal unit. A comparison of the three groups of ranches indicated some of the reasons for the greater profitability of ranches in the high income class. In the following pages the differences in the ranch organization and operation of the three groups are compared.

General information. - There was no appreciable difference in the length of time ranchers in the three groups had been operating their ranches. Nearly 50 per cent of those reporting had been on their particular places more than 20 years and 78 per cent had been on them more than ten years.

There appeared to be some association between classification of the type of vegetative cover and success of the operation. Also the ranches of the most profitable group were closer on the average to a shipping point (Table 7).

Table 7. - Location of 80 British Columbia ranches as to type of vegetative cover and distance from shipping point.

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
- Number of ranches -				
Vegetative cover:				
Grass and bush	13	13	10	36
Predominantly bush	12	15	16	44
- Miles -				
Average distance to shipping point	26	27	33	29

Operating statement. This is the statement that sums up the production year's business in concise form and tells the story on the profitability of the operation. Consideration is given in compiling the business statement, to receipts in the form of inventory increases along with cash income. On the expense side, decreases in inventory are considered along with interest on capital and the value of unpaid family labor as cost items. The operator's labor income is the residue remaining to the rancher for cash living expenses, repayment of debts or for new capital savings after all other costs have been paid. He does have, in addition to this, the perquisites or items such as farm produce and housing that are provided by the ranch towards the family maintenance.

Table 8.- Operating statement per ranch on 80 full-time ranches in British Columbia for year ending March 31, 1959

	: Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per ranch -				
Current receipts	14,741	15,717	12,307	14,291
Capital Receipts	278	314	618	401
Inventory increase	3,660	3,773	1,556	3,016
Total ranch receipts	18,679	19,804	14,481	17,708
Current expenses	7,893	11,345	10,104	9,820
Capital expenses	2,666	2,291	2,654	2,531
Inventory decrease	435	841	732	673
Total ranch expenses	10,994	14,477	13,490	13,024
Ranch family income	7,685	5,327	991	4,684
Less:				
Interest on investment	4,769	5,380	4,908	5,028
Value unpaid family labor	187	289	562	344
Operator's labor income	2,729	-342	-4,479	-688
Plus:				
Value of perquisites	947	1,014	979	980
Operator's labor earnings	3,676	672	-3,500	292

A study of ranch receipts and expenses for the respective income groups showed that the per animal unit cost of production on the low income ranches was definitely reflected in the eventual unprofitable operation for the

business year under review. Total ranch receipts varied between groups from \$75 to \$87 per animal unit, with the lower income group having an average income of \$84 per animal unit. Total ranch expenses, however, were \$51 per animal unit in the high income group as compared with \$78 per animal unit in the low income group. Interest on capital calculated at a rate of five per cent and employment of additional family labor further increased the spread in per animal unit operating expenses between the high and low income groups of ranches.

The operator's labor income per animal unit for these three groups of ranches were as follows: high income \$13. medium income \$-1. and low income \$-26. In terms of per ranch averages the operator's labor incomes were, respectively, \$2,729, \$-342 and \$-4,479 (Tables 8 and 9).

Table 9-- Operating statement per animal unit on 80 full-time ranches in British Columbia for the year ending March 31, 1959

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal unit	214	262	173	217
	- dollars per animal unit -			
Current receipts	69	60	71	65
Capital receipts	1	1	4	2
Inventory increase	17	14	9	14
Total ranch receipts	87	75	84	81
Current expenses	37	43	59	45
Capital expenses	12	9	15	12
Inventory decrease	2	3	4	3
Total ranch expenses	51	55	78	60
Ranch family income	36	20	6	21
Less:				
Interest on investment	22	20	29	23
Value unpaid family labor	1	1	3	1
Operator's labor income	13	-1	-26	-3
Plus:				
Value of perquisites	4	4	6	4
Operator's labor earnings	17	3	-20	1

An analysis of the production costs of beef per 100 pounds told the same story from a sample of a smaller number of ranches. In this case the low income group had an operator's labor income of \$-8.17 per 100 pounds of beef produced compared with \$3.93 for the high income group (Table 10).

Table 10.. Cost per 100 pounds of beef produced on 54 full-time ranches in British Columbia for the year ending March 31, 1959

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	20	18	16	54
Average size in animal units	189	246	153	197
- dollars -				
Receipts per 100 pounds beef	19.50	18.91	18.82	19.12
Operator's labor income per 100 pounds beef	3.93	.08	-.17	-.42
Cost per 100 pounds beef produced	15.57	18.83	26.99	19.54

Land utilization.— The average size of all full-time ranches was 3,211 acres including both owned and leased land. Operators on these ranches reported the average value of all owned land, (1,984 acres per ranch) as being \$21 per acre.

All three groups were comparable with regard to forest range allotted to them under grazing permit. This amounted to a cost of about 52 cents per animal unit for the 1958 season, for approximately three and a half months of grazing.

Table 11.. Land utilization per ranch on 80 full-time ranches in British Columbia in 1958

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- acres per ranch -				
Improved crop and hay land:				
Irrigated	129	217	110	154
Non-irrigated	84	66	101	83
Meadows	50	41	60	50
Total	263	324	271	287
Unimproved land:				
Range and timber grazing	1,543	1,878	1,385	1,609
Waste	93	108	63	88
Total owned land	1,899	2,310	1,719	1,984
Leased land	1,610	1,547	498	1,227
Total land operated	3,509	3,857	2,217	3,211

The top income group had more acres of owned and leased land per animal unit than did the bottom income class. As a consequence the low income class required a greater acreage per animal unit of improved land. For reasons incongruous with the land use pattern, operators in the low income group estimated their lands to be of greater value per acre than did those where ranch operations were more profitable (Table 12).

Table 12.— Land values per acre on 80 full-time ranches in British Columbia in 1958

	Operator's labor income per animal unit			
	High	Medium	Low	All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per acre -				
Improved crop and hay land:				
Irrigated	95	80	139	98
Non-irrigated	87	75	87	84
Meadows	69	57	59	62
Total improved	87	76	102	87
Unimproved land:				
Range and timber grazing	9	9	10	9
Waste	-	-	-	-
Average total land value per acre	21	19	25	21

A study of the data reported in Table 7 and Tables 11 to 14 indicate that the nature of the land as associated with its productive capacity has a distinct bearing on profitable ranch operation. These observations are enumerated as follows:

(a) The limited acreage of land leased by the low income group (2.9 acres per animal unit) as compared with the high income group (7.6 acres per animal unit) was attributable to differences in location. Because there was Crown acreage available for lease adjacent to the headquarters of the high income ranches, this group was more favorably situated. In the low income class this was not the case, with the result that these ranchers were short of spring and fall grazing, thus requiring more acres of improved land per animal unit for feed production and home pasture.

(b) Although the low income operators had the least desirable ranch lands, they valued both their improved and unimproved owned areas at a higher value per acre rate than did those more favorably located. In the business analysis this higher per acre value was reflected in ranch capitalization and imputed interest charges.

(c) On the top income operations, the yield of hay per acre from irrigated land was 1.8 tons as compared with one ton from non-irrigated acreages. These ranches were located in the more open grass areas where precipitation was a limiting factor. On the other hand, the low income class was generally situated in regions of greater rainfall because without irrigation hay yields averaged 1.3 tons per acre. Nevertheless these operators, because they required more feed per animal unit, developed irrigation projects for the purpose of increasing per acre yields. On irrigated lands they produced 1.7 tons of hay per acre.

Table 13.- Land utilization per animal unit on 80 full-time ranches in British Columbia in 1958

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- acres per animal unit -				
Improved crop and hay land:				
Irrigated	.6	.8	.6	.7
Non-irrigated	.4	.2	.6	.4
Meadows	.2	.2	.4	.2
Total	1.2	1.2	1.6	1.3
Unimproved land:				
Range and timber grazing	7.2	7.2	8.0	7.4
Waste	.4	.4	.3	.4
Total owned land	8.8	8.8	9.9	9.1
Leased land	7.6	5.9	2.9	5.7
Total land operated	16.4	14.7	12.8	14.8

Table 14.- Land values per animal unit on 80 full-time ranches in British Columbia in 1958

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per animal unit -				
Improved crop and hay land:				
Irrigated	57	66	88	68
Non-irrigated	34	19	51	33
Meadows	17	9	21	14
Total improved	108	94	160	115
Unimproved land:				
Range and timber grazing	66	64	80	69
Waste	-	-	-	-
Average total land value per animal unit	174	158	240	184

Cattle operation.— The cattle operation was very similar on all ranches in the various income classes, (Table 15). An exception to this statement was the small number of two-year-old steers in the low income group, which suggested that these operators were marketing younger cattle. There was uniformity in some of the production practices as: —

(a) The cows or breeding herd made up 40 per cent of the total livestock numbers at the beginning of the business year, including in the total count of livestock numbers, the 1958 calf crop.

(b) Number of cows including heifers assumed bred was 30 per bull. The middle income group had an average of 32 cows per bull, and they had the lowest percentage calf crop.

Table 15.— Cattle numbers as of April 1, 1958 and calves born in 1958-59 on 80 full-time ranches in British Columbia

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- number per ranch -				
Breeding stock - cows and 2 yr. heifers	130	171	112	139
Steers - 2 yrs. and over	30	35	10	25
Yearlings - steers and heifers	80	87	67	78
Calves born - 1958	96	113	80	97
Bulls	6	7	5	6
Total	342	413	272	315
Cows per bull	27	32	2	—
- per cent -				
Calf crop	73.8	66.1	71.4	70
Stock losses	2.7	2.6	2.5	2.6
Proportion cows of herd	38	41	41	40

(c) Stock losses were kept at a safe level or below three per cent for all groups, on the average.

(d) Calf crop averaged 70 per cent, with the medium income group having the lowest or 66 calves per 100 cows. Two-year-old heifers on hand in the spring (April 1, 1958) were assumed to have been in the breeding herd as yearlings.

A scarcity of lease land for spring and fall grazing in the low income group, necessitated the feeding of more hay per animal unit on these ranches.

Ranchers reported the winter feeding period as being about the same in all groups, or 4.3 months. The low income group required 500 pounds more hay per animal unit than the top earning class. As a result the ratio of hay consumed to one pound of meat produced was ten pounds in the one group as compared with 8.3 pounds in the other. The explanation of this was that top income operators were able to supplement feeding with pasture whereas the low income operators were not.

Table 16.. Hay consumption and feeding period on 80 full-time ranches in British Columbia 1958-1959

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Hay consumed per animal unit, (tons)	1.33	1.36	1.58	1.41
Average feeding period.(months)	4.2	4.3	4.3	4.3
Hay used per pound of meat produced (pounds) .	8.3	8.5	10.0	8.8

The high and medium income groups had a balanced sales program, which included two-year-old steers and calves as well as yearlings. On the low income ranches emphasis was given to selling younger cattle, namely, yearlings and calves. It is possible the sales policy of the low income group resulted from: -

(a) Operators being forced to sell younger cattle because of financial pressure.

(b) Operators in this class being of the opinion that buyer demand had permanently shifted to a preference for younger cattle. Operations on these ranches were being adjusted to conform to market opportunities.

(c) Quality of feed available. If younger cattle were sold, rougher feed could be used for wintering the remaining herd.

From the information reported, it was not possible to arrive at positive conclusions as to why the noted differences existed in the respective marketing programs (Table 17).

Table 17.. Class of cattle sold as a proportion of total sales on 80 full-time ranches in British Columbia for the year 1958-1959

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
Cattle sold per ranch (number)	88	96	77	87
- per cent -				
Cows and two-year-old heifers	24	21	18	21
Steers - two-year-olds and over	26	28	12	23
Yearlings - steers and heifers	31	34	47	37
Calves	17	15	21	17
Bulls	2	2	2	2
Total	100	100	100	100

No particular differences were evident between groups in the average weights of animals marketed. Ranchers stated average weights of cattle marketed in 1958 to be: -

Cull cows	1,040 pounds
Steers - 2 year olds	940 "
Steers - yearlings	715 "
Heifers - yearlings	645 "
Calves	375 "
Bulls	1,475 "

Weights of ranch cattle marketed in any one year are associated with climatic and range conditions of the period as well as management practices followed.

Labor efficiency.-- Those ranches operating on the most profitable basis made more efficient use of labor than did the others. In part this may be the result of location as associated with physical factors, but it may also be due to differences in the efficiency of management (Table 18).

On the top income ranches one man was able to handle 109 animal units, or in other words, it required 2.8 days of labor per year per animal unit. The respective figures on the low income ranches were 64 animal units and 4.9 days of labor. Labor included not only care of the cattle, but production of feed and all work allied with raising livestock. The labor requirement was proportionately greater on low income than high income ranches for each month of the year (Figure 7).

During the haying months of June, July and August, the top earning group made more pay per man per month than did the bottom class or 41 tons and 35 tons respectively.

Table 18.- Labor efficiency on 80 full-time ranches in British Columbia 1958-1959

	: High	: Medium	: Low	operator's labor income per animal unit : All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
Animal units per man-equivalent	109	96	64	87
Days of labor per animal unit	2.8	3.3	4.9	3.5
Tons of hay produced per man-haying month (June, July, Aug.)	41	35	35	37

Ranch capital.— The average full-time ranch in the area studied had a capital investment of over \$100,000 or \$463 per animal unit. Capital investment included real estate (land, buildings and improvements) equipment, livestock and feed supplies on hand.

The low income group had a greater investment in most items needed for ranch operation than did the other groups. Per animal unit values were higher for real estate, equipment, and feed and supplies on hand on the less profitable ranches. Either because of the physical location of the ranch, or the management efficiency level of the owner, it required an investment in equipment of \$41 for each ton of feed produced on the low income ranches, compared with \$29 per ton in the high income group (Table 19).

Table 19.— Distribution of capital on 80 full-time ranches in British Columbia 1958-1959

	operator's labor income per animal unit			
	High	Medium	Low	All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars -				
Investment:				
Capital per ranch	95,392	107,602	98,155	100,563
Capital per animal unit	447	410	569	463
Investment in machinery per ton of feed produced	29	25	41	31
- per cent -				
Distribution of ranch capital:				
Real estate	48	46	52	48
Livestock	41	44	32	40
Equipment, feed and miscellaneous	11	10	16	12

See Appendix 1 for detailed tabulations on ranching investment.

A recognized maxim in the ranching business has been that operators should have between 40 per cent and 45 per cent of their capital invested in livestock. The high and medium income ranches conformed to this pattern, but the low income group had only 32 per cent of their capital in livestock.

Capital Investment and Operator's Labor Income per Cow on High Income Ranches (26).— Ranch operators in the high income group because of preferred ranch location or better management had a return of \$17 per animal unit as operator's labor income after all expenses had been paid including an imputed interest charge at a rate of five per cent on average capital investment. In producing this operator's labor income of \$13 per animal unit, these operators made use of capital in the amount of \$95,392 per ranch or \$447 per animal unit (Table 19).

In determining the earning capacity of a ranch, owners usually think in terms of size of the breeding herd or numbers of reproductive cows. For this reason in the following paragraph the capital investment and operator's labor income is expressed on a per cow basis.

Of a total livestock inventory of 214 animal units, the high income group had an average of 130 cows (mature cows and two-year-old females) per ranch (Table 15). The capital investment per cow amounted to \$734 and each returned to the owner \$21 as operator's labor income.

Ranch Liabilities.— Ranch indebtedness was low, amounting to not more than five per cent of the total capitalization in any of the three groups. Long-term debt of \$28 per animal unit was greatest on the low income ranches compared with \$17 per animal unit on the other two groups. During the business year under study, the high and low classes improved their debt position by two dollars and four dollars per animal unit while liabilities increased on the medium income group by one dollar per animal unit (Table 20).

Table 20.— Long term liabilities on 80 full-time ranches in British Columbia for the year ending March 31, 1959

	Operator's labor income per animal unit			
	: High	: Medium	: Low	: All ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars -				
Liabilities per ranch	3,580	4,368	4,924	4,293
Liabilities per animal unit	17	17	28	20
Change in liabilities per animal unit during business year	- 2	+1	-4	-2

See Appendix 5 for details tabulation of liabilities.

HOURS OF LABOR
PER ANIMAL UNIT

..... HIGH INCOME RANCHES
----- MEDIUM " "
— LOW " "

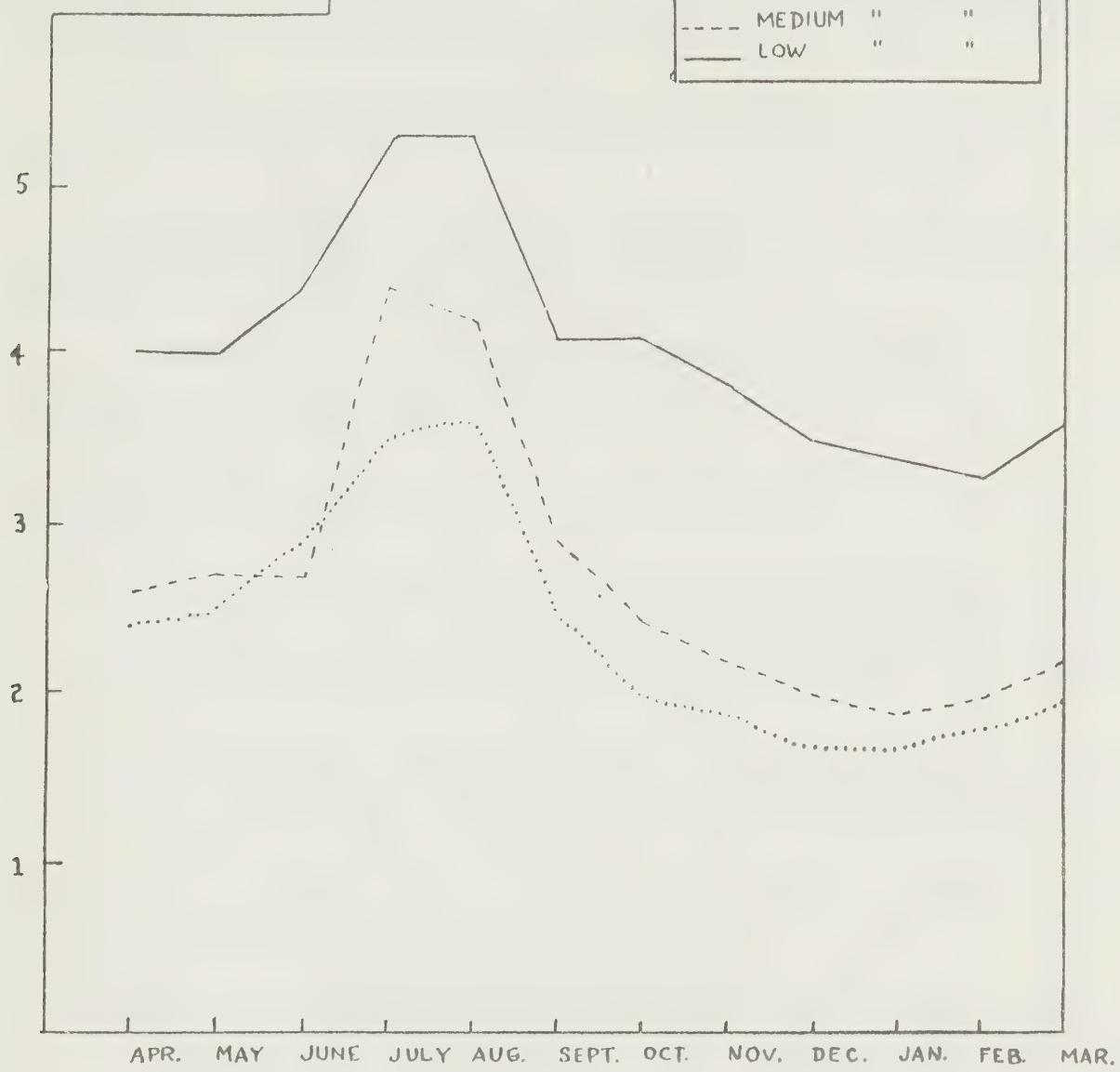


FIGURE 7.- RELATIONSHIP OF LABOR EFFICIENCY
to OPERATOR'S LABOR INCOME PER ANIMAL
UNIT, 1958 - 1959

Long-term liabilities mainly included outstanding amounts on ranch purchases and improvements, equipment, and livestock purchases. The small debt load as related to value of investment suggested:

(a) Most operators had been on their particular ranches for many years and ranch real estate sales had not been common, unless for a high proportion of cash.

(b) Due to tenure having been for long periods, the present ranch investment was more the result of real estate appreciation than an indication of the amount of the initial capital input.

Summary and Observations on Full-Time Ranch Operations

1. Ranches in the high, medium and low income groups were scattered throughout the entire ranching region. ○

2. There was an association between ranch location and management on the high income group of ranches because:-

(a) These ranches appeared to be more favorably located, many being in the more open grassland areas, and so situated that leased acreages were available for spring and fall grazing. Consequently fewer improved acres were required and less hay per animal unit for winter feeding than on the low income classified group.

(b) Labor was more efficiently utilized. One man provided all of the labor requirements associated with the care of 109 animal units in the high income group as compared with 64 animal units in the low income group.

(c) Ranch capital amounted to \$447 per animal unit. Investment in livestock comprised 41 per cent of this total.

(d) The benefits attributed to location and management were apparent in the cost of operation rather than in the ranch receipts. Costs for replacement and operation of equipment, and labor expenses were less per animal unit than they were on the low income group of ranches.

3. Lower earnings resulted in the medium income group because the ranch location was somewhat less desirable and management was less efficient in some respects than on top income ranches.

(a) As compared with the high income group they had fewer acres of lease and fewer total acres per animal unit. Hay yields were slightly lower and somewhat more feed per animal unit was required. On the other hand there were more acres of irrigation per animal unit, and a greater proportion of this group had irrigation schemes.

(b) The medium income group had the lowest average calf crop or 66 per cent and the largest number of cows (33) per bull.

- (c) Utilization of labor was less efficient being one man for each 96 animal units.
- (d) Capital, it appeared, was more efficiently utilized amounting to \$410 per animal unit with the investment in livestock being 44 per cent of the total.
- (e) Total receipts were somewhat less while total expenses per animal unit were higher than in the top income group of ranches. Liabilities per animal unit showed a slight increase.

4. On the low income group of ranches both location and management contributed to their unprofitable operation.

- (a) More of these ranches were located in areas where the vegetative cover was predominantly bush, and where acreages were limited that were classified as transitional for leasing purposes as compared with lands set aside by the Crown in forest reserves. Because this group had fewer acres per animal unit of leased land for spring and fall grazing they required more acres of improved land to provide winter feed and additional home pasture. Hay consumption was 500 pounds per animal unit more than in the high income group. To provide this additional feed these ranchers had more acres improved per animal unit and probably because of both location and irrigation had slightly higher hay yields per acre.
- (b) They marketed younger cattle than either of the other two groups. It was not possible to arrive at any positive conclusions of the effect of this on the profitability of the operation.
- (c) Efficiency of labor utilization was very low being one man for every 64 animal units.
- (d) Capital investment was high at \$569 per animal unit. Distribution of capital was considered unfavorable as only 32 per cent of the total was in livestock.
- (e) This income grouping had the highest operating expenses per animal unit, resulting particularly from the equipment replacement and operational costs, the amount of hired labor, and interest levied on the above average capital investment per animal unit.

5. Other production factors associated with profitable operation on individual ranches, but which did not appreciably influence the group average results were:-

- (a) Percentage calf crop.
- (b) Cows per bull.
- (c) Stock losses.
- (d) Market age and weights and stock sold.
- (e) Ease of operation of the particular ranch.

6. The analysis of the records of 80 full-time ranches indicated the main factors associated with profitable operation were that location should be favorable to producing livestock under ranch conditions and that management should be capable of utilizing all of the factors of production in a balanced relationship.

RANCHING ASSOCIATED WITH OTHER OCCUPATIONS OR ENTERPRISES

Thirty-four operators had returns from cattle and sheep of less than 70 per cent of total returns, but they also had income from non-ranch work, or other enterprises. Depending on source of reported additional income, this group was divided into three sub-classes, namely: part-time, two enterprise, and off-type operations.

A.- Part-time Ranching.- Seventeen operators were defined as being in this class. They were those who had returns from cattle and sheep of less than 70 per cent of total returns and returns from non-agricultural sources which formed a substantial part of their income. The average size of the livestock herds in this group of 43 animal units.

In the southern portion of the Interior Plateau there are a variety of other industries providing seasonal and all-year employment for casual workers. Participation in this type of employment was financially beneficial to this group of people when it was associated with ownership of a small ranch which also furnished a year-round place of residence. The other main industries of the area were fruit growing, logging and lumbering, and an increasing tourist business embodying all phases of catering from guest ranch services to guiding for hunting and fishing parties. Generally, the part-time operators were located reasonably close to where non-ranch work was available and probably due to the importance of logging and lumbering they were mainly in areas classified in land use as predominantly bush.

Nearly all part-time operators stated that they eventually intended to be full-time ranchers after they had built up sufficient financial reserves to purchase more land or cattle, and were able to acquire additional leased lands and grazing permit privileges. Nevertheless the period of tenure of part-time ranchers indicated that this type of ranching was a permanent part of the economic pattern of the region. These ranchers had been operating an average of 12 years, and all but five of them had been on their respective places more than five years. As a class they were family men and had an average of two children. Only one was not married. Their ages varied from 24 years to 59 years with the average being 40 years.

The part-time ranchers were employed in a variety of jobs, but 13 out of the 17 part-time ranchers were associated with the lumbering industry in some manner.

1. Land utilization.- Part-time ranchers had an average of 653 acres of land including leased acreages. This amounted to 15.3 acres per animal unit of which 2.9 acres were classed as improved (Table 21).

Table 21.- Land use on 17 part-time ranches in British Columbia, 1958-1959.

Number of ranches	17	:	:	:
Average size in animal units	43	: Per ranch	- acres -	: Per animal unit
Improved land:				
Irrigated	39			.9
Non-irrigated	71			1.7
Meadows	14			.3
Total improved	124			2.9
Unimproved land:				
Range and timber grazing	368			8.7
Waste	32			.7
Total land owned	524			12.3
Leased land	129			3.0
Total size	653			15.3

These operators placed an average value of \$34 per acre on the land they owned, valuing the improved and unimproved land at \$108 and \$9 per acre respectively.

Hay was the predominant crop grown, with hay yields averaging 1.1 tons per acre. From the irrigated fields 1.5 tons per acre of hay were harvested while on non-irrigated fields yields were 0.9 ton. Irrigation was practised on only eight of the part-time ranches. Four of the operators used sprinklers, one spread water by furrow and three flooded the hay fields in the spring from run-off water.

2. Cattle operation.-- Part-time ranches used 1.86 tons of hay per animal unit and had an average winter feeding period of 4.75 months. Hay consumption was 900 pounds more per animal unit than the average used on full-time ranches, and the feeding period averaged about 13 days longer. Both the location of the ranch and the nature of a part-time operation may be factors associated with a greater per animal unit feed intake and a longer feeding period. Possibly the owners, because they were away at other work found it necessary to feed more abundantly for a longer period.

The calf crop averaged 78 per cent from a breeding herd that included both mature cows and two year old heifers. Stock losses, which averaged four per cent, were higher than those on full time ranches but may have been the result of the operator's absence at critical times.

Including calves born during 1958, part-time ranchers had an average of 69 head of cattle at the beginning of the business year. They disposed of 21 head per ranch, mainly calves. Of the total numbers of animals sold, 48 per cent were calves and 28 per cent yearlings (Table 22).

Table 22.- Livestock on 17 part-time ranches in British Columbia in 1958-1959

	:	On hand beginning	:
Number of ranches	17	of year	Sold
Average size in animal units	43	April, 1958	1958-1959
- number -			
Breeding-stock-cows and two year heifers		31	4
Steers-two years and over		1	1
Yearlings -- steers and heifers		12	6
Calves born - 1958		24	10
Bulls	.	1	-
Total		69	21

3. Labor efficiency.-- Part-time operators reported the time that they and their families and hired help spent working on the ranch during the year. The efficiency of labor use was low, possibly due in part to the small herds demanding proportionately more time than larger ones and because of factors associated with the operator's absence.

The level of labor efficiency calculated, indicated 52 animal units required the full time of one man. In other words, there were six days of ranch work per year for each animal unit.

On these ranches having an average of 43 animal units, there were a total of 257 days spent on ranch work. The operator worked approximately half time on the ranch or the equivalent of 145 days, while the farm family contributed 79 days and hired labor 33 days. Family and hired labor were used particularly during the summer haying season.

4. Ranch capital.-- The average investment on part-time ranches amounted to nearly \$36,000. Proportion of capital in livestock was 21 per cent compared with 40 per cent on full-time ranches. This was primarily the result of the small ranch size, where a minimum home requirement formed a larger proportion of the total investment than was the case on full-time ranches. For example, value of the house at \$3,160 amounted to \$74 per animal unit. Similarly a limited investment in essential operating equipment comprised a greater proportion of the total capital than on larger ranch units (Table 23).

5. Operating statement.-- The operating statement presents a financial picture of the ranch operation for the period under review.

Table 23.. Ranch capital and efficiency of capital utilization on 17 part-time ranches in British Columbia in 1958-1959

Number of ranches	17	:	Per animal	Distribution	
				Per ranch	unit
			- dollars -	- per cent -	
Real estate		23,016	541		64
Livestock		7,502	176		21
Equipment, feed and miscellaneous		5,367	127		15
Total		35,885	844		100

On the part-time ranches an average operating loss for the business year was experienced, with Operator's Labor Income being -\$1,349 per ranch or \$-32 per animal unit. Although Operator's Labor Income was not in itself indicative that part-time ranching was unprofitable, it must be remembered the operator worked less than half time on the unit, while at the same time, from the home it provided, he was able to secure non-ranch employment which returned him \$2,774 per year (Table 24).

Table 24.. Operating statement on 17 part-time ranches in British Columbia for the year ending March 31, 1959

Number of ranches	17	:	Per ranch	Per animal	
				unit	
			- dollars -		
Current receipts			3,614		85
Capital receipts			115		2
Inventory increase			1,351		32
Total ranch receipts			5,080		119
Current expenses			2,642		62
Capital expenses			1,230		29
Inventory decrease			390		9
Total ranch expenses			4,262		100
Ranch family income			818		19
Less: Interest on investment			1,795		42
Value unpaid family labor			372		9
Operator's labor income			-1,349		-32
Plus: Value of perquisites			739		18
OPERATOR'S LABOR EARNINGS			-610		-14
Non-ranch receipts			2,774		65

Important points of the statements of Ranch Receipts and Expenses, (Appendix 6 and 7) and of the Operating Statement are as follows:

- (a) Per animal unit income from livestock sales were comparable with those on full-time ranches, but receipts from miscellaneous items as custom work, crop, farm produce and forest products sales were much higher. The inventory increase of total ranch assets, as a result of capital expenditures, amounted to \$32 per animal unit compared with \$14 on full-time ranches. Total ranch receipts were \$119 per animal unit on part-time operations and \$82 per animal unit on full-time ranches.
- (b) Total ranch expenses were \$100 per animal unit on part-time ranches or \$40 per animal unit greater than on full-time cattle enterprises. Particular cost items that were higher per animal unit on part-time ranches were livestock and machinery operation expenses. Part-time ranches spent about \$15 per animal unit on cattle purchases, mainly cows and heifers, thus indicating a tendency to increase the size of their operation. Cost of operating equipment was \$19 per animal unit in contrast to \$8 on full-time ranches. Larger units apparently used machinery more efficiently.
- (c) Capital expenditures amounted to \$29 per animal unit. Money was spent on land and building improvements, and for new machinery. A substantial non-ranch income allowed part-time operators to spend proportionately more (nearly two and one-half times) per animal unit than full-time ranchers on capital items.
- (d) Farm perquisites, that is use of the house and farm produce by the operator and his family, amounted to \$739 per ranch on part-time units. This sum associated with \$2,774 per year non-ranch income per operator, aided these people in becoming better established in the ranching business.

6. Ranch Liabilities.— Part-time operators had a long time average debt of \$3,021 per ranch or \$71 per animal unit (Table 25). The liabilities were about 8.4 per cent of the reported capital investment. These ranches during the business year studied paid down their long-term accounts by \$199 per ranch or by \$5 per animal unit.

B. Two-Enterprise Ranches.— There were five ranches classified in this group. They were defined the same as part-time ranchers with the exception that the size of livestock enterprise was a full-time operation having more than 100 animal units. The average size of this grouping was 140 animal units. As well as conducting a full-time ranching operation this group participated in some other activity producing a substantial revenue from non-agricultural sources.

The majority of two-enterprise ranchers earned additional income from work associated with the forest industry.

Table 25.- Liabilities on 17 Part-Time Ranches in British Columbia
1958-1959

Number of ranches	17	Per Ranch	Per animal Unit
Average size in animal units	43		- dollars -
Amount owing April 1, 1958		3,220	76
Net payments on debts		199	5
Amount owing April 1, 1959		3,021	71
Interest paid on debts		110	3

These ranchers were located in areas classified as predominantly bush grazing, thus being convenient to the non-ranch business operated.

Two-enterprise ranchers owned an average of 1,387 acres of which 148 acres were improved hay and crop land or hay meadows, and they leased 1,164 acres. This was the equivalent of 18.2 acres per animal unit exclusive of land under grazing permit.

Capital investment in these 140 animal unit ranches amounted to \$71,716, or \$512 per animal unit. The proportion of capital invested in livestock was 32 per cent, somewhat below the accepted standard for a successfully operating ranch.

Current ranch receipts were \$9,083 per ranch or \$65 per animal unit, and current ranch expenses were \$7,823 per ranch or \$56 per animal unit. On this group of ranches, capital receipts were distorted and reflected in a large inventory decrease because one operator disposed of real estate to a value of \$25,000.

As a ranch business, the operation for the year studied was not profitable on the average. The operator's labor income equalled -\$2,525 per ranch or -\$18 per animal unit, (Table 26). Two factors appeared to contribute to the negative labor income of the operators, namely, a low investment in livestock as a proportion of total capital, and dividing the management function between full-time ranching and a non-agricultural enterprise.

The operators devoted about three-quarters of their time to the ranching operation. Ranch labor requirements were for the operator, 252 days; family contribution, 160 days, and hired labor, 139 days per year. Total ranch labor was the equivalent of 79 animal units for each one-man year of work.

On two-enterprise ranches, as with part-time ranches, the unit was an operating headquarters for other remunerative activities. Value of perquisites averaged \$1,010 per year for each family. In addition, operators, by

devoting about one-quarter of their time and some capital in equipment, were able to earn \$3,371 per year from participation in non-agricultural enterprises.

Long-term ranch debt was \$6,157 per unit at the end of the business year studied, amounting to about 8 1/2 per cent of the total capital investment. During the period April 1, 1958 to March 31, 1959, there was no appreciable change in the ranch liabilities.

Table 26.- Operating Statement on Five Two-Enterprise Ranches in British Columbia for the Year Ending March 31, 1959

Number of ranches	5	Per Ranch	Per Animal Unit
<hr/>			
Average size in animal units	140		
		- dollars -	
Current receipts	9,083	65	
Capital receipts	5,406	38	
Inventory increase	1,234	9	
 Total ranch receipts	 15,723	 112	
Current expenses	7,823	56	
Capital expenses	2,213	16	
Inventory decrease	3,826	27	
 Total ranch expenses	 13,862	 99	
<u>Ranch Family Income</u>	1,861	13	
(Interest on investment	3,586	25	
Less (Value unpaid family labor	800	6	
 <u>Operator's Labor Income</u>	 -2,525	 -18	
Plus - Value of perquisites	1,010	7	
Operator's labor earnings	-1,515	-11	
 <u>Non-Ranch Receipts</u>	 3,371	 24	

C.- Off-Type Ranches.. There were 12 ranches classified as off-type, because returns from cattle and sheep were less than 70 per cent of total returns, and returns from other ranch products exceeded all other sources of income. This group, scattered throughout the ranching region, tended towards a mixed farming type of operation. Off-type ranches were evenly distributed between areas classified as grassland grazing and predominantly bush.

The average size of these ranches was 1,200 acres of owned land and 415 acres of lease, or the equivalent of 18.9 acres per animal unit. They had 216 improved acres which included 99 acres under irrigation.

Total capital investment amounted to \$63,946 per ranch. The value of live-stock was 24 per cent of all capital.

Table 27-- Operating Statement on 12 Off-Type Ranches in British Columbia for the Year Ending March 31, 1959

Number of ranches	12	Per Ranch	Per Animal Unit
Average size in animal units	85		- dollars -
Current receipts	10,593		124
Capital receipts	536		6
Inventory increase	1,730		21
 Total ranch receipts	 12,859		151
Current expenses	6,902		81
Capital expenses	2,196		26
Inventory decrease	1,276		15
 Total ranch expenses	 10,374		122
 <u>Ranch Family Income</u>	 2,485		29
Less Interest on investment	3,239		38
(Value unpaid family labor	192		2
 <u>Operator's Labor Income</u>	 -946		-11
Plus - Value of perquisites	926		11
Operator's Labor Earnings	-20		-
 <u>Non-Ranch Receipts</u>	 84		1

Cattle and sheep sales of \$6,628 per ranch were equal to 62 per cent of the current receipts, while revenue from other ranch sources was \$3,965. These operators each marketed one or more other ranch products, namely: fruit, cream, milk, potatoes, corn, hay, pigs, turkeys, logs, ties or Christmas trees. In the current ranch expenses of \$6,902, the largest item of cost was \$2,206 for labor. This expense was associated with crops that required intensive field work.

This group of ranchers had a negative Operator's Labor Income, averaging -\$946. Diversification apparently did not produce sufficient benefits to compensate for a below average allocation of capital in livestock (24 per cent) as a proportion of total investment (Table 27).

Off-type operators owed an average of \$6,874 per ranch at the conclusion of the business year studied or the equivalent of about 11 per cent of the total capital investment. The long-term debt was increased during the 12-month period by \$522 per ranch.

D - Summary and Observations of Ranches Associated with Other Occupations or Enterprises.-

1. A group of 34 ranches in this classification were divided into three sub-classes namely, Part-time, Two-enterprise and Off-type, according to size as expressed in animal units and by sources of additional income.
2. The three sub-classes each had a low livestock investment as a proportion of total capital. Investment in livestock was 21 per cent on part-time, 32 per cent on two-enterprise and 24 per cent on off-type ranches.
3. Part-time ranches comprised 15 per cent of the total number of operations studied, and appeared to have a permanent place in the agricultural pattern of interior British Columbia. Although the ranches were small operations having an average of 43 animal units, they provided the owner with a home convenient to seasonal work. Important employment opportunities were in the forestry industries. Average non-ranch earnings of part-time operators amounted to \$2,774 per year.
4. Two-enterprise ranchers, a small group of five, operated full-time ranches having an average of 140 animal units, and participated in some other non-agricultural enterprise, again mainly associated with the forestry industry. Although the ranch, on the average, was not a profitable venture in itself, it provided a headquarters for the owners to pursue other remunerative activities. These other activities earned operators for their time and capital involved, an average net of \$3,371 per year.
5. Off-type ranches were a group of 12 operators, that had diversified agricultural operations with 62 per cent of the current revenue derived from sales of cattle and sheep. The average size of livestock enterprise was 85 animal units. The financial statement suggested that in ranch country diversification was not a profitable method of operation.

APPENDIX 1.- Capital Used on 80 Full-Time Ranches in British Columbia
1958-1959

	Operator's Labor Income per Animal Unit			
	: High	: Medium	: Low	: All Ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per Ranch -				
Real estate - land	37,351	41,616	41,839	40,302
house	4,530	3,917	3,720	4,052
other buildings	3,564	3,448	5,595	4,184
Total real estate	45,445	48,981	51,154	48,538
Livestock	39,034	47,324	31,846	39,599
Equipment, feeds and misc.	10,913	11,297	15,155	12,426
Total capital per ranch	95,392	107,602	98,155	100,563
- Dollars per Animal Unit -				
Real estate - land	175	159	242	185
house	21	15	22	19
other buildings	17	13	32	19
Total real estate	213	187	296	223
Livestock	183	180	184	182
Equipment, feeds, misc.	51	43	89	58
Total Capital per animal unit	447	410	569	463

APPENDIX 2-- Average Value of Special Equipment per Animal Unit on 80 Full-Time Ranches in British Columbia, 1958-1959

	Operator's Labor Income per Animal Unit			
	High	Medium	Low	All Ranches
Number of Ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per Animal Unit -				
Cars	4.99	3.64	4.06	4.18
Trucks	4.94	3.43	8.86	5.31
Tractors - wheel	8.39	7.86	12.77	9.30
crawler	2.54	2.84	4.78	3.25
Balers - hay	3.42	4.23	5.09	4.19
Irrigation equipment	5.41	1.49	11.78	5.40
Total	29.69	23.49	47.34	31.63

APPENDIX 3.- Receipts on 80 Full-Time Ranches in British Columbia 1958-1959

	Operator's Labor High	Income per Animal Unit Medium	Low	All Ranches
No. of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per Ranch -				
Cattle and sheep	14,309	14,721	11,587	13,569
Other livestock	27	309	186	177
Total livestock	14,336	15,030	11,773	13,746
Custom work	12	245	28	99
Crop sales	144	235	114	166
Livestock produce and misc.	177	118	302	197
Forest products	72	89	89	83
Total current receipts	14,741	15,717	12,306	14,291
Total capital receipts	278	314	618	401
Total increase inventory	3,660	3,773	1,556	3,016
Total ranch receipts	18,679	19,804	14,480	17,708
Non-ranch receipts	93	277	214	196
- Dollars per Animal unit -				
Cattle and sheep	67	56	67	62
Other livestock	a/ 1	1	1	1
Total livestock	67	57	68	63
Custom work	a/ 1	1	a/ 1	a/ 1
Crop sales	1	1	1	1
Livestock produce and misc.	1	1	2	1
Forest products	a/ a/	a/ a/	a/ a/	a/ a/
Total current receipts	69	60	71	56
Total capital receipts	1	1	4	2
Total increase inventory	17	14	9	14
Total ranch receipts	87	75	84	82
Non-ranch receipts	a/ a/	1	1	1

a/ Less than .50 dollars.

APPENDIX 4.- Expenses on 80 Full-Time Ranches in British Columbia, 1958-1959

	Operator's labor Income per Animal Unit			
	High	Medium	Low	All Ranches
Number of ranches	26	28	26	80
Average size in animal units	214	262	173	217
- dollars per Ranch -				
Real estate	830	1,146	860	951
Livestock	2,870	3,322	2,693	3,146
Crops	306	320	392	339
Equipment	1,600	1,730	2,154	1,825
Irrigation	90	17	143	82
Custom work	130	281	173	197
Labor	1,808	3,645	3,161	2,890
Interest on current loans	55	139	164	120
Miscellaneous	204	245	364	270
Total cash expenses	7,893	11,345	10,104	9,820
Total capital expenses	2,666	2,291	2,654	2,531
Total inventory decrease	435	841	732	673
Total Ranch Expenses	10,994	14,477	13,490	13,024
- dollars per Animal Unit -				
Real estate	4	4	5	4
Livestock	13	15	16	14
Crops	1	1	2	2
Equipment	7	7	13	8
Irrigation	a/	a/	1	a/
Custom work	1	1	1	1
Labor	8	14	18	13
Interest on current loans	a/	a/	1	1
Miscellaneous	1	1	2	1
Total Cash Expenses	37	43	59	45
Total Capital expenses	12	9	15	12
Total Inventory decrease	2	3	4	3
Total expenses per Animal Unit	51	55	78	60

a/ Less than 50 dollars.

APPENDIX 5.- Liabilities on 80 Full-Time Ranches in British Columbia, 1958-1959

	Operator's Labor		Income per Animal Unit	
	High	Medium	Low	All Ranches
Number of Ranches	26	28	26	80
Average size in animal units	214	262	173	217

- dollars per Ranch -

Amount owing April 1, 1958	4,154	4,220	5,575	4,639
Net payments on debts	574	-148	651	346
Amount Owing April 1, 1959	3,580	4,368	4,924	4,293
Interest paid on debts	210	197	188	199

- dollars per Animal Unit -

Amount owing April 1, 1958	19	16	32	22
Net payment on debts	2	-1	4	2
Amount owing April 1, 1959	17	17	28	20
Interest paid on debts	1	1	1	1

APPENDIX 6.— Receipts on 17 Part-Time Ranches in British Columbia 1958-1959

Number of ranches	17	Per Ranch	Per animal Unit
Average size in animal units	43		
		-	dollars
Cattle and sheep	2,774		65
Other livestock	51		1
Total livestock	2,825		66
Custom work	84		2
Crop sales	280		7
Livestock produce and miscellaneous	166		4
Forest products	259		6
Total Current Receipts	3,614		85
Total Capital Receipts	115		2
Total Increase Inventory	1,351		32
Total Ranch Receipts	5,080		119
Non-Ranch Receipts	2,774		65

APPENDIX 7. - Expenses on 17 Part-Time Ranches in British Columbia 1958-1959

Number of Ranches	17	Per Ranch	Per Animal Unit
Average size in animal units	43		
- dollars -			
Real estate	286	7	
Livestock	1,006	23	
Crops	122	3	
Equipment	795	19	
Irrigation	7	<u>a/</u>	
Custom work	90	2	
Labor	237	6	
Interest on current loans	6	<u>a/</u>	
Miscellaneous	93	2	
Total cash Expenses	2,642	62	
Capital Expenses	1,230	29	
Total Inventory Decrease	390	9	
Total Ranch Expenses	4,262	100	

a/ Less than .50 dollars.

APPENDIX 8. - ANIMAL UNITS

<u>CLASS OF LIVESTOCK</u>	<u>NUMBER OF ANIMALS PER A.U.</u>
Horses	1.0
Colts, 1-2 yrs	2.0
Colts, under 1 yr.	4.0
Dairy cows	0.75
Beef cows	1.0
Dairy heifers, over 1 yr.	1.5
Beef heifers, 1-2 yrs	1.5
Steers, over 2 yrs	1.0
Steers, 1-2 yrs	1.5
Calves, under 1 yr.	4.0
Bulls	1.0
Sows	3.0
Market hogs, 200 pounds	5.0
Feeder hogs, 100 pounds	10.0
Boars	3.0
Sheep	7.0
Lambs	14.0
Goats	7.0
Chickens	72.0
Turkeys raised	80.0
Turkeys for breeding stock	50.0
Ducks	72.0

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